

2006-07

Tippecanoe County K-12 Student Body Mass Index Assessment

**Tippecanoe County Health Department
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EXECUTIVE SUMMARY

This is the third year the Tippecanoe County Health Department has collected the heights and weights of students in public and private schools for Body Mass Index (BMI) Screening. The original purpose was to establish a benchmark for children 6-19 in order to compare data with national and state statistics. Schools now use the data to help them see the effects of their mandated wellness policy changes over time. Grant proposals using this data to fund intervention and prevention programs have also been received. The data collection and report have now become an annual project.

A smaller number of students were measured in 2006-07. These are the results.

- 2% are underweight
- 60% are normal
- 17% are at risk for overweight
- 21% are overweight

This year the data was analyzed by age using the last three years of data.

Highlights of this data are

- Among Head Start children there is an increasing trend of children At risk for Overweight (2005-06)
- Of our youngest children ages 2-5 17% are already At Risk for Overweight
- Age 12 has the highest percentage of At Risk and Overweight children
- At Risk for Overweight and Overweight percentages tend to increase up to age 12 and decrease slightly as children age

Race/Ethnicity

- Among the Black population in Tippecanoe
 - 16% were At Risk for Overweight
 - 25% were Overweight
- Among the Hispanic population in Tippecanoe
 - 20% were At Risk for Overweight
 - 35% were Overweight
- Tippecanoe County's Black and Hispanic population have a significantly higher Overweight population

A survey of 6th graders (n=414) in Lafayette found:

- 51% of them were trying to lose weight
- 29% eat fruit less than once a day and 14.4% eat no fruit
- 44.2% skip one meal a day, usually breakfast
- 77.7% play on at least one sport team a year
- 60.8% watch 2 or more hours of TV per day

INTRODUCTION

This is the third year the county healthy department has done BMI screening with public and parochial schools in the county. This year the following schools were weighed and measured:

- Battleground Elementary
- Burnett Creek Elementary
- Lafayette Jeff
- St. Lawrence
- St. Mary
- Tecumseh Middle
- Wainwright Middle
- Wea Ridge Elementary
- Pleasantview Christian
- Mintonye Elementary
- New Community Charter
- Oakland Elementary

A total of 2888 students were weighed this year. Thank you to all the schools and staff for their help and participation. In 2004-05, 4,954 measurements were taken and in 2005-06 4,869 measurements were taken. Over the last three years over 12,000 students have been weighed and measured.

The format of the report has been simplified to make it shorter and easier to read. The focus is on the trend of At Risk for Overweight (85th to 95th percentile) and Overweight children (>95th percentile) in the population rather than on a specific school or corporation. Each school that was involved in the sample the past year received a report on their school's results. With three years of data we are able to look at children by age, race, and ethnicity, which is helpful to schools and staff.

Last year Marion County for the first time did a BMI Screening collecting actual data rather than self report. For obvious reasons self report is not a valid sample of weight and height among children or adults. While the participating schools were voluntary, the sample size was large, 90,000+. This gives another benchmark in which to compare our community along with older, but true national data.

The goal of collecting data annually is to help schools, parents, health organizations, and non profit agencies understand where our youth are in relation to the nation and state. It is also a catalyst for more physical exercise, healthy nutrition education, and evidence based science for non profits. Armed with this information non profits and health care professionals are better able to plan and implement programs for prevention and intervention for our children.

BACKGROUND

Health professionals use the Body to Mass Index (BMI) to determine if a person is overweight or obese. This index relates weight to height. An increased body weight in relation to height when compared to some standard of acceptable or desirable weight is the definition used by the CDC as overweight. Obesity is defined as an excessively high amount of body fat or adipose tissue in relation to lean body mass in adults. With children, BMI is figured the same, but the charts differ by age (in months) and gender vs. the charts that are standard for adults.

BMI is not an actual measure of the amount of body fat in an individual, but it is the most highly correlated indicator of body fat when using the two easiest variables to obtain, height and weight. There are other predictors and measures of body fat, such as waist circumference and waist to hip ratio.

This measurement is used because it is the most time efficient and the least intrusive to the student. This annual screening is designed to look at the overall trend of the student population in Tippecanoe County, not individual students.

The formula used to calculate the BMI is as follows:

$$\text{BMI} = [\text{Weight} \times 703 / \text{Height} \times \text{Height} \text{ (Units in inches and lbs.)}]$$

There are four classifications for children, Underweight, Normal, At Risk for Overweight, and Overweight. The two classifications that are of the greatest concern for children are the upper two groups, “At risk for Overweight”, and “Overweight”. In terms of percentile, Underweight is <5% percentile, Normal is from the 5th percentile to the 84th percentile. At risk for Overweight is the classification for the 85th percentile to the 94th percentile. Overweight is the 95th percentile and above. (Center for Disease Control and Prevention, 2004).

There is not an “obesity” classification for children as there is for adults. Children have growth spurts at several different times before adulthood. Each child grows at their own individual rate. A BMI that is between the 85th and 95th percentile is “At risk for Overweight”, but in an adult that is considered overweight. A BMI >95th percentile is considered overweight for children, but obese in adults.

The interpretation of growth charts for BMI is not straightforward and should be emphasized in teaching school personnel and others that work with children. A BMI of 21 for an eleven year old boy is at the 88th percentile or considered “at risk for being overweight”. A BMI of 21 for a 12 year old boy is the 85th percentile and barely considered “at risk”. The timing of the growth of children greatly affects the BMI category. The steepness of growth charts can show rapid change over time.

Children grow at an individual rate therefore these charts are made to reflect this nation’s younger population over time. Antidotal evidence shows that children grow “wide before they grow tall” and these charts take this developmental stage into consideration. Accuracy of a child’s age is critical and

therefore charting BMI by months of age, instead of years, or grades is essential in making an assessment. BMI Growth charts are similar to pediatric growth charts. Children that are overweight are more likely to be overweight as adults and at risk for other chronic illnesses, all of which are a growing public health concern.

METHODOLOGY

The data has been collected each year for the last three years. The cooperation of health teachers, nurses, principals, and the administrative staff of the three school corporations has been outstanding. Tippecanoe County Health department staff, Purdue nursing students, and student interns have also helped weigh and measure the students.

All data was collected without names or personal identification. Date of Birth is required because BMI growth charts are based on months of age. Assuring anonymity and not tracking individual students over consecutive years was a reassurance that aided in cooperation among students and school administrators.

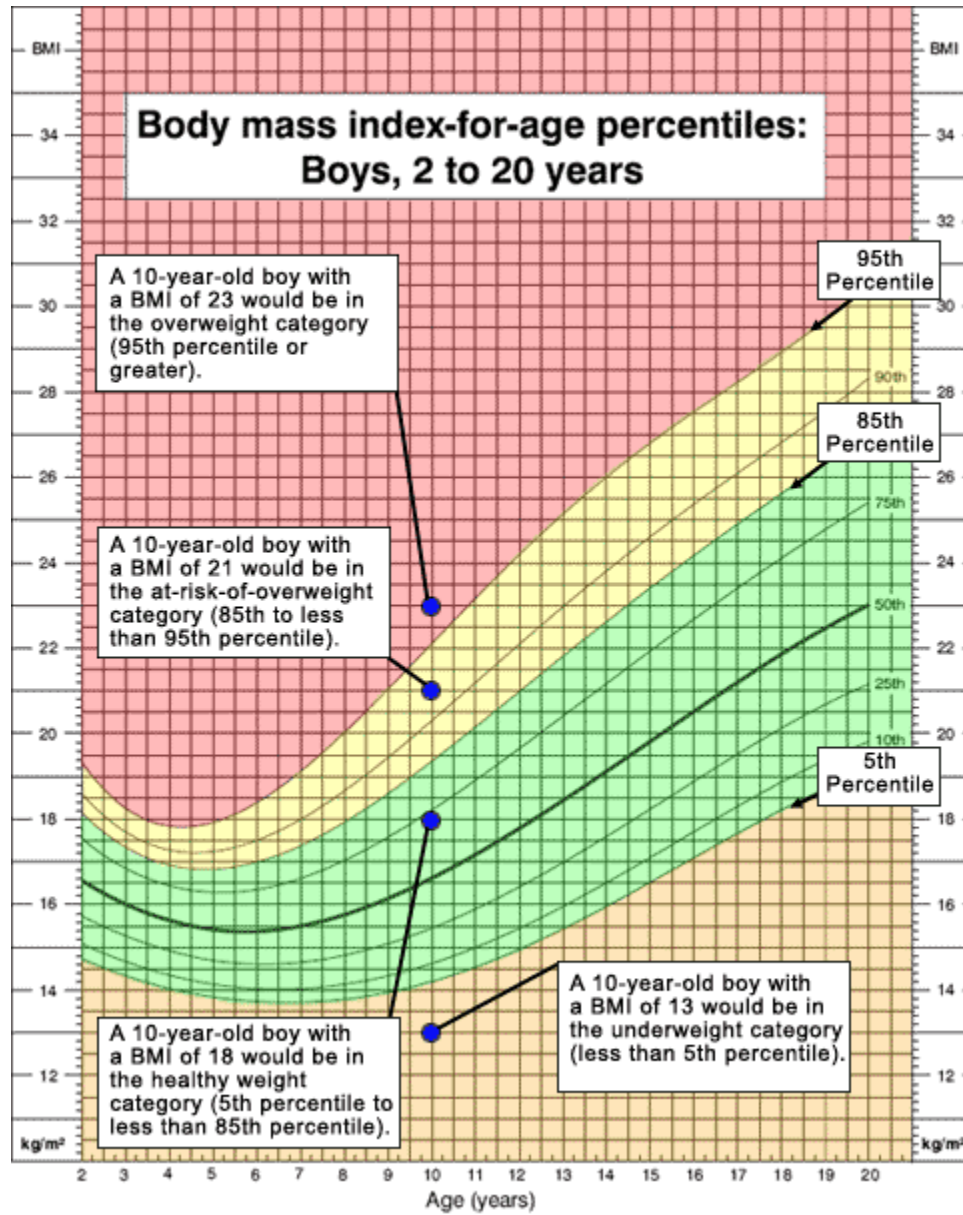
A tape measure and electronic scale were used. Students were asked to remove their shoes and height measurements were taken to the nearest quarter inch. The electronic scale weighed to the nearest half pound.

The data was entered into EXCEL spread sheets and converted to an Access database. This data was then entered into the EPI INFO program, NutSTAT which calculates a gender and age specific BMI for each student. It also calculates the percentile for each entry based on their gender and months of age. The percentile indicates the relative position of the child's BMI number among children of the same sex and age. The growth charts show the weight status categories used with children and teens (Underweight, Normal, At Risk of Overweight, and Overweight).

TABLE 1: CDC guidelines of percentiles

Classification	National Percentile
Underweight	Less than the 5th percentile
Healthy Weight/Normal	5 th percentile to the 84 th percentile
At Risk for Overweight	85 th percentile to the 94 th percentile
Overweight	95 th percentile and up

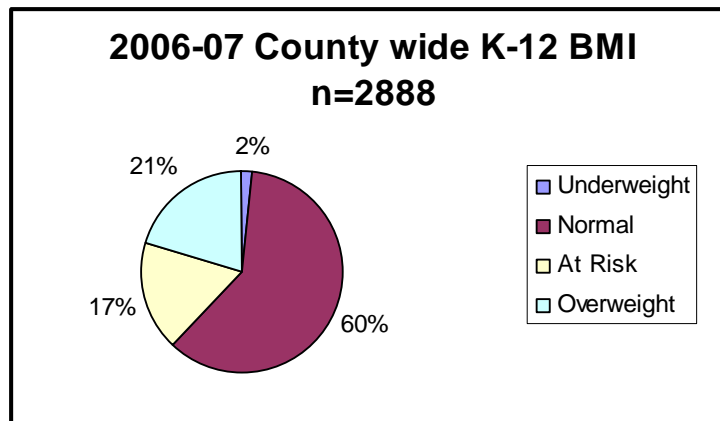
This chart from the Centers for Disease Control (CDC) shows how the EPI INFO software program calculates the percentile for each child. There is a different graph for girls than boys.



RESULTS

Of the 2888 students that were weighed in 2006-07

- 2% are underweight
- 60% are normal
- 17% are at risk for overweight
- 21% are overweight



The graph below shows all three years of data from school years 2004-05, 2005-06, 2006-07. Over half of the students in Tippecanoe County have been measured. This includes parochial and independent schools. In comparing Tippecanoe to other benchmarks there is a lot of similarity.

Marion County, Indiana shows:

18% At Risk for Overweight and 22% Overweight

(Source: Child health and Wellness Initiative Results

http://www.mchd.com/CHWI_results_report.htm)

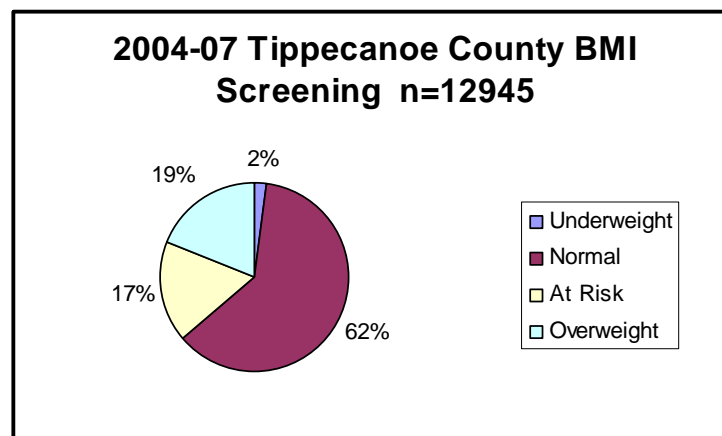
School districts outside of Marion County show:

17% At Risk for Overweight and 19.9% Overweight

(Source: Indiana School Weight and Height Collection Project, 2005-06, <http://www.in.gov/isdh/programs/cnop/>)

Tippecanoe County shows:

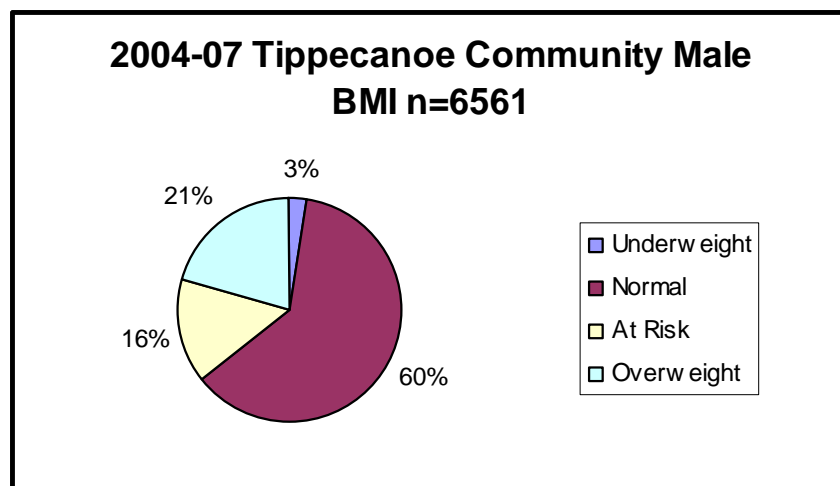
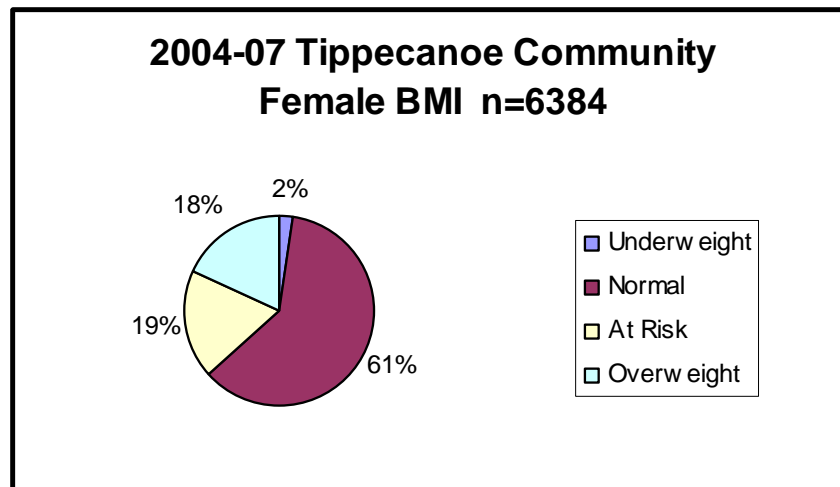
17% At Risk for Overweight and 19% Overweight



The risk of obesity differs by gender. The following graphs show the females and males over the last three years. There are more males that are Overweight than females, but more females are At Risk for Overweight than males. This remains the same as children age.

Tippecanoe County differs from Marion County, which show little difference between the males and females in their respective categories. The percentage for Marion County is 18% At Risk for Overweight for both males and females and for Overweight 23% for males and 21% for females. (Source: Child health and Wellness Initiative Results)

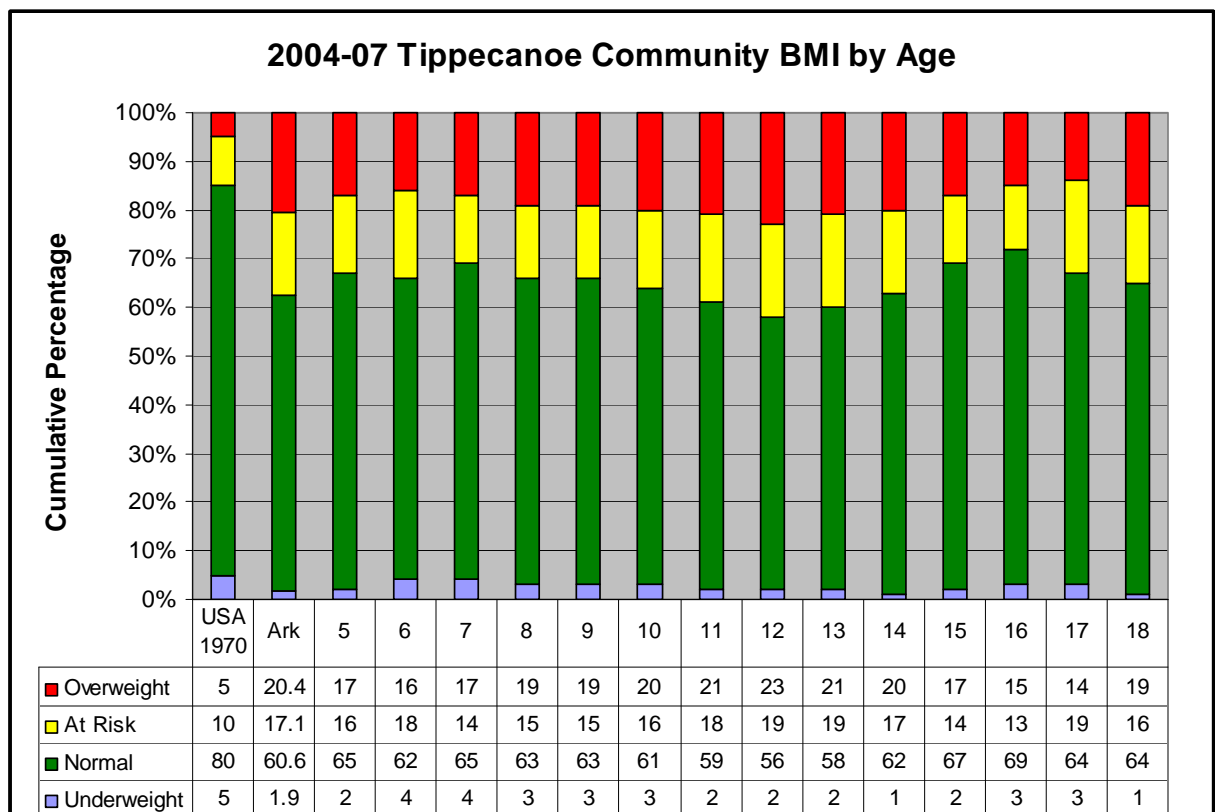
Females, K-12 in Tippecanoe County are different than the males in Tippecanoe County. Notice in the graphs below females are 19% At Risk for being Overweight, whereas males are 16%. The prevalence of females Overweight is 18% whereas with males it is 21%.



Age

Analyzing the data by age shows which ages are at the highest risk and how the trend of obesity follows children as they mature. A benchmark for the US in 1970 and recent statistics for Arkansas are on the left side of the graph for reference. (Prevalence of Overweight and Obesity in the United States, 1999-2004, JAMA, April 5, 2006 Vol 295, No.13)

- A third of our children begin school (age 5) already At Risk for Overweight or Overweight, or 1 in 3.
- Age 12 is when the combined category of At Risk for Overweight and Overweight is highest, 42% or 4 in 10 children.
- The percentage of underweight children is 1-4%.

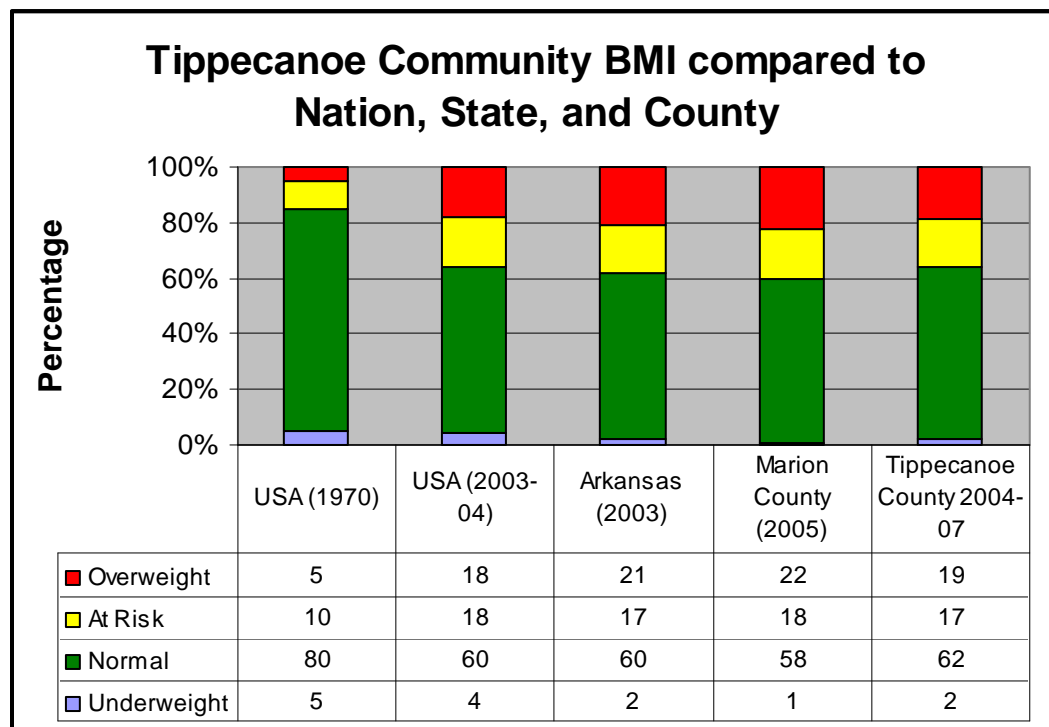


This age chart follows the same trend as Marion County and Indiana counties outside of Marion. Over a third of the children begin school At Risk for Overweight or Overweight. The gain in weight continues to increase up to age 12, at which point, the combined categories of At Risk for Overweight and Overweight start to decrease as the students mature. However the sum total of At Risk and Overweight remain a significant piece of the population even at the end of high school. At the end of their high school career more than 35% of

students find themselves At Risk for Overweight or Overweight before they venture into real life.

State and National Comparisons

- Over the last 30 years the number of children who are At Risk for Overweight and Overweight has doubled
- Tippecanoe County has fewer overweight (95th percentile), but more children At Risk for Overweight than Arkansas
- The adult population in Indiana has always ranked in the top ten for obesity. In 2006 27.8% of adults in the state were obese (Source: Calorie Lab, <http://calorielab.com/news/categories/obesity-statistics/>)
- 62.8% of adults in Indiana are Overweight or Obese (Source: Calorie Lab)
- All ages have a serious problem of obesity
- In 1970 15% of 5-19 yr old children were At Risk for Overweight or Overweight
- Today in Tippecanoe 17% of our children are At Risk for Overweight and 19% are Overweight

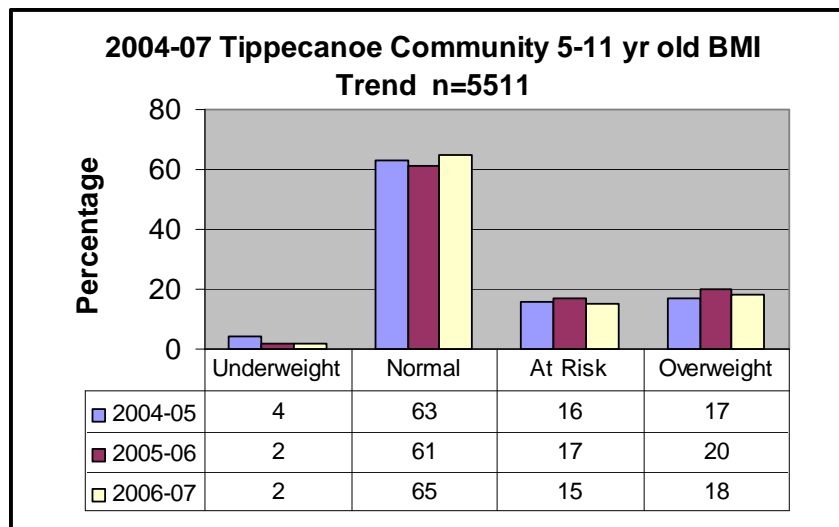


- 36% nationwide are At Risk for Overweight and Overweight
- In Arkansas 38% are At Risk for Overweight and Overweight
- In Marion County, Indiana 40% are At Risk for Overweight and Overweight
- For the last three years in Tippecanoe 36% were At Risk for Overweight and Overweight

Age Groups and Trends

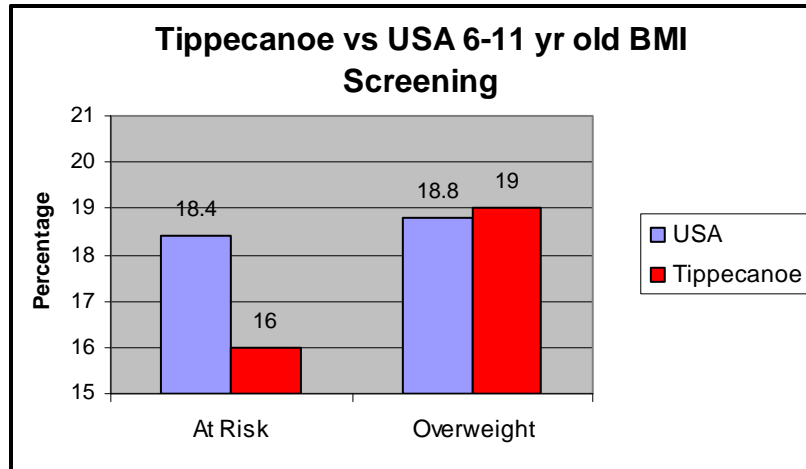
The CDC separates children into two age groups 5-11 and 12-19 for comparison. While all age groups have At Risk for Overweight and Overweight children it is helpful to distinguish between the age groups to see if there are differences. Children's bodies are changing rapidly as they grow. The graphs below show the trend of the Tippecanoe community each year. Important points to note:

- The percentage of children underweight has decreased in the last 3 years
- The percentage of children At Risk for Overweight increased, but has decreased below it's original level in 2004-05
- The percentage of children Overweight has decreased since last year, but is still higher than it was in 2004-05



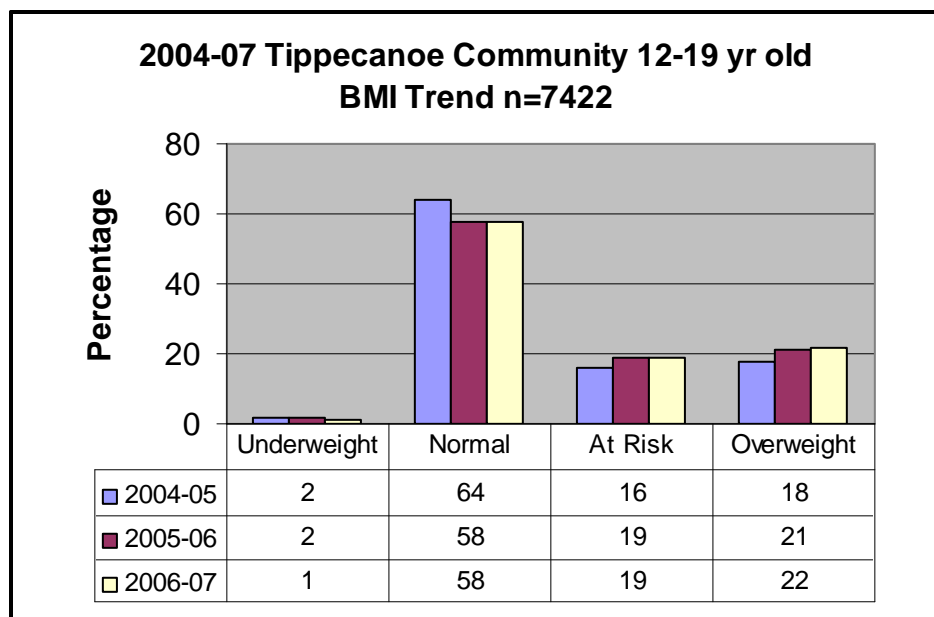
The prevalence of At Risk for Overweight among younger children in Tippecanoe County is lower than the national average. However the percentage of students Overweight is about the same as the nation.

All of the following comparisons of the Tippecanoe community with a national benchmark use NHANES data the source is: Prevalence of Overweight and Obesity in the United States, 1999-2004, JAMA, April 5, 2006 Vol 295, No.13)



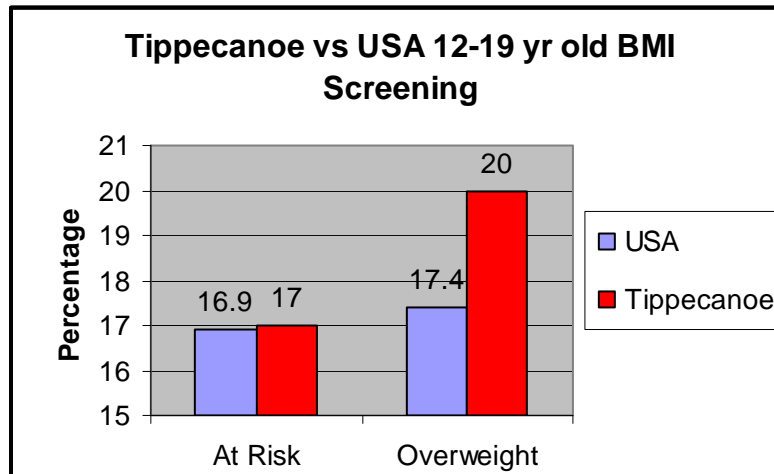
The next two graphs deal with older children. In looking at older children (age 12-18) the important points to note are:

- The percentage of underweight has decreased
- The percentage of At Risk for Overweight children did increase since 2004-05, but has remained stable
- The Overweight category has increased in percentage over the last three years, but the rate of increase has slowed



When comparing older children in Tippecanoe County to the nation the At Risk for Overweight categories are similar, but the Overweight category is substantially more.

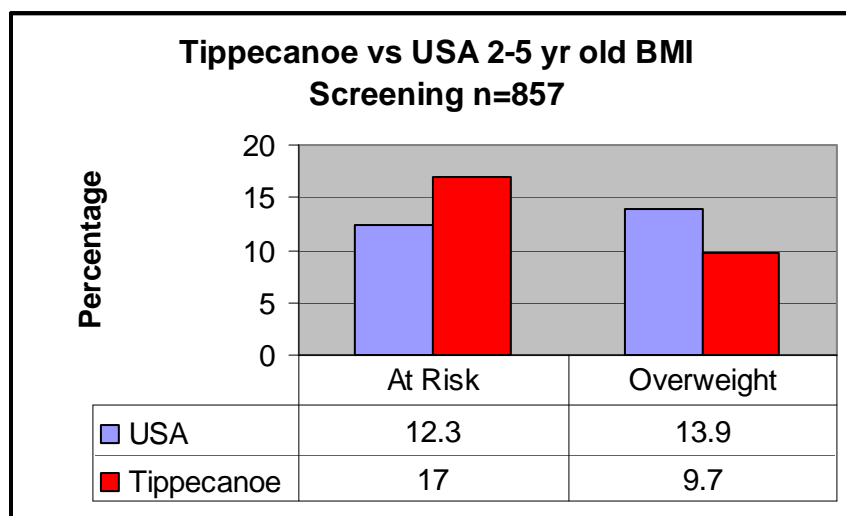
Indiana has consistently been one of the top ten heaviest states with adults so it is not a surprise that our children follow in those footsteps.



Data for children younger than school age is not easily collected. In Tippecanoe County the Head Start facility shared the last two years of their BMI screening with the County Health Department. This sample does not have the same representation as the data collected throughout the schools in the county. These children are at a socio economic disadvantage and the results indicate a serious problem.

- In 2005 out of the 182 children screened, 30 children (16.5%) were either At Risk for Overweight or Overweight
- 28 were At Risk for Overweight and 2 were Overweight
- In 2006 out of 205 children screened 42 children (20%) were either at Risk for Overweight or Overweight
- 39 were At Risk for Overweight and 3 were Overweight

The graph below shows children aged 2-5 in Tippecanoe County (including the Head Start data) from 2004-07 and compares them with the national benchmark.

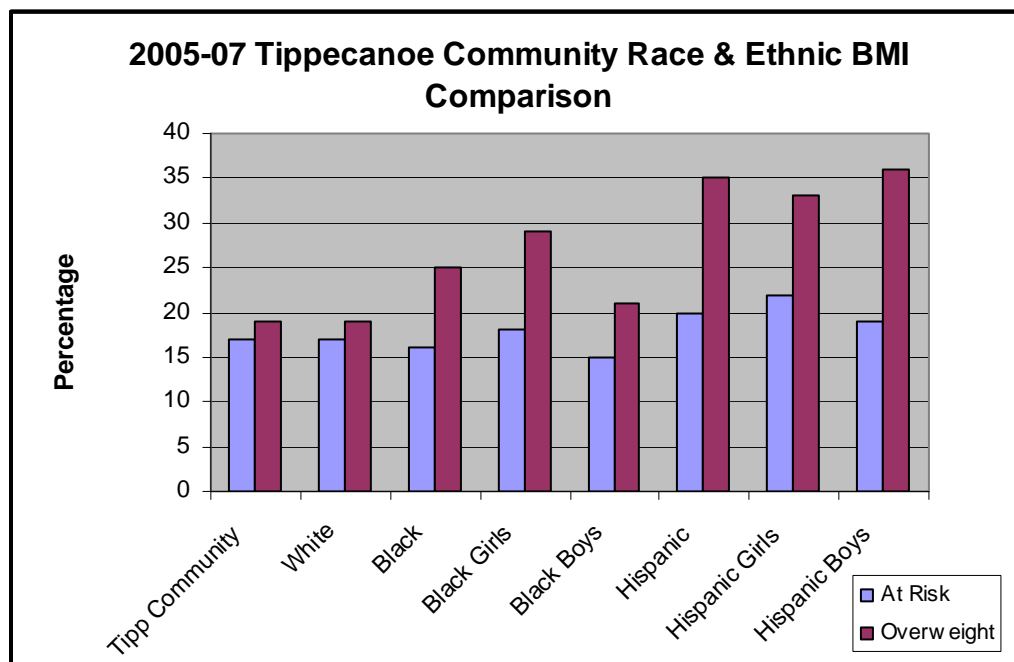


The graph above shows that even among our youngest children 17% are At Risk for Overweight as they enter their school age years. Compared to the nation at 12.3%, this is a serious problem. The prevalence of children that are overweight in the youngest category is almost 10%, one in ten, but does compare favorably to the nation.

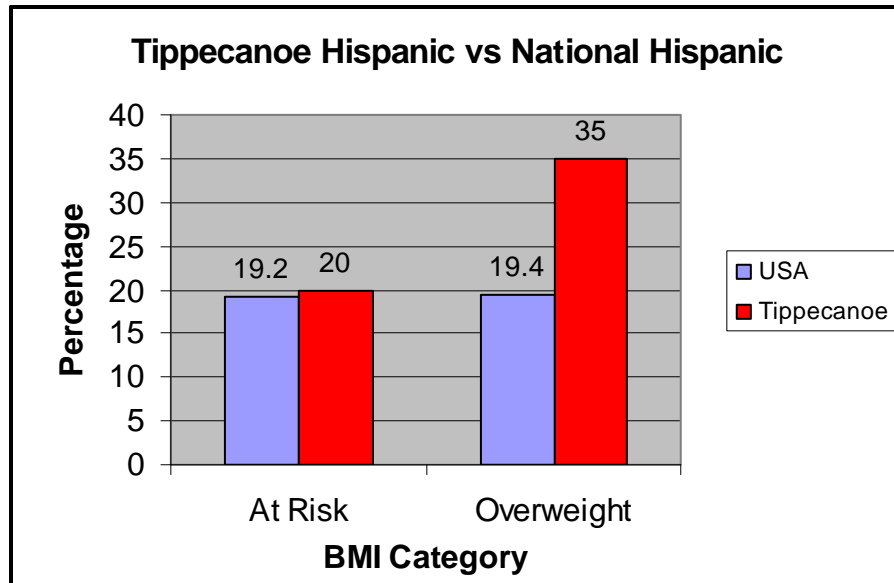
Race/Ethnicity

Minority groups are more at risk than the white population when dealing with overweight issues. Tippecanoe community has an increasing minority population. These numbers are of grave concern because overweight children are more likely to become overweight adults that are afflicted by chronic diseases such as diabetes and heart disease. The first year of this study race and ethnicity were not recorded, therefore this data represents two school years worth of data, 2005-07.

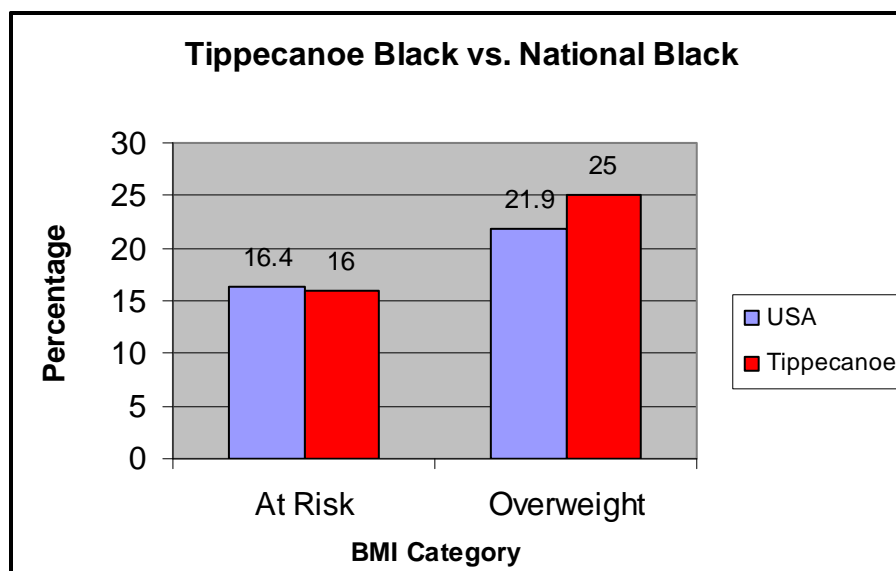
- Between 2005-07 7787 students were screened for BMI, of those
 - 17% were At Risk for Overweight
 - 19% were Overweight
- Among the white population in Tippecanoe n=5917
 - 17% were At Risk for Overweight
 - 19% were Overweight
- Among the Black population in Tippecanoe n=328
 - 16% were At Risk for Overweight
 - 25% were Overweight
- Among the Hispanic population in Tippecanoe n=455
 - 20% were At Risk for Overweight
 - 35% were Overweight
- Tippecanoe County's Black and Hispanic population have a significantly higher At Risk for Overweight and Overweight population



Nationwide Black and Hispanic children are at higher risk for being At Risk for Overweight and Overweight. However the Hispanic population in Tippecanoe is significantly more overweight than the Hispanic community nationwide.



The Black population in Tippecanoe is more overweight than the Black population nation wide, but not with the same severity as the Hispanic population. The national benchmarks for both of these charts is Prevalence of Overweight and Obesity in the United States, 1999-2004, JAMA, April 5, 2006 Vol 295, No. 13

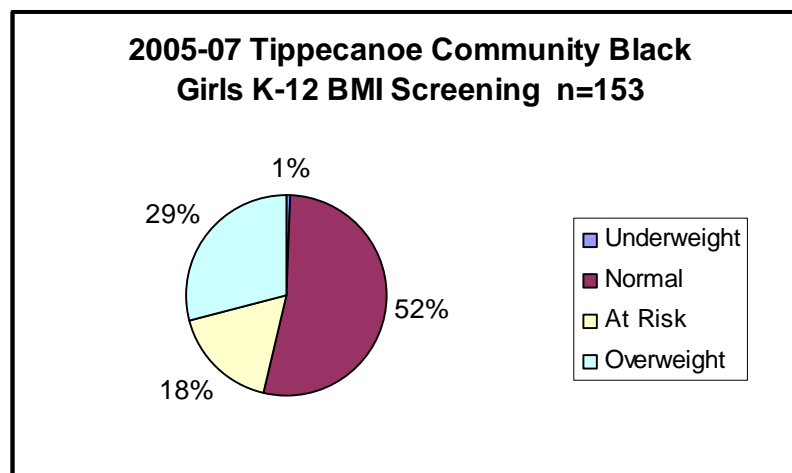
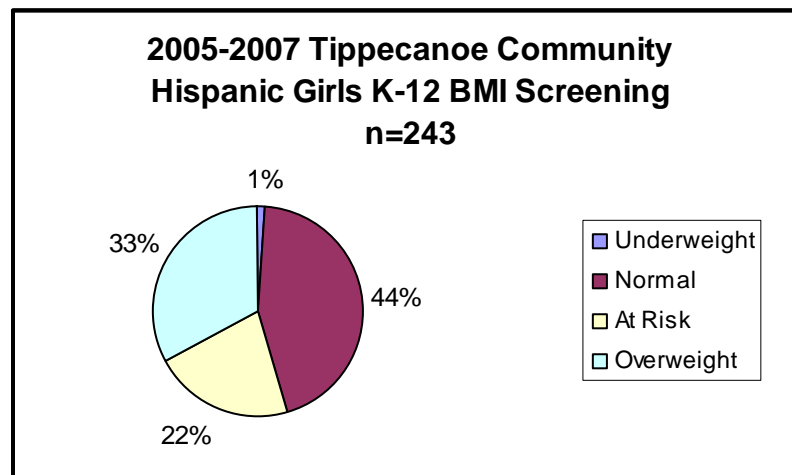


Gender within Ethnicity and Race

- 22% of Hispanic females are in the At Risk for Overweight and 33% are Overweight
- 19% of Hispanic males are in the At Risk for Overweight and 36% are Overweight
- 18% of Black females are in the At Risk for Overweight and 29% are Overweight
- 15% of Black males are in the At Risk for Overweight and 21% are Overweight

Hispanic females and males are of concern because their At Risk for Overweight and Overweight prevalence is the highest among all the groups in the community. Hispanic females have the most At Risk for Overweight at 22% and Hispanic males have the highest prevalence of Overweight at 36%.

- More than one in three K-12 Hispanic males is Overweight
- One in three K-12 Hispanic females is Overweight
- Greater than one in five Hispanic females is At Risk for being Overweight
- Greater than one in four K-12 Black females is overweight



Behavioral Survey Results

In 2006-07 an abbreviated survey similar to the Youth Behavior Risk Survey that is standard nation wide was administered to all 6th graders at Sunnyside. Below is a summary of the findings.

A survey of 6th graders (n=414) in Lafayette found:

- 51% of them were trying to lose weight
- 29% eat fruit less than once a day and 14.4% eat no fruit
- 44.2% skip one meal a day, usually breakfast
- 77.7% play on at least one sport team a year
- 60.8% watch 2 or more hours of TV per day

Race/Ethnicity

- A much higher percentage, 65% of Hispanic students are trying to lose weight compared to white students, 46%
- 58% of Black students are trying to lose weight
- Black students eat breakfast at school at a much higher rate, 65% compared to Hispanic students at 42% or white students at 22%
- Hispanic and Black students use vending machines at a much higher rate than their white counterparts, 61.8% vs. 38.7%
- Hispanic and Black 6th graders at Sunnyside watch 2 or more hours of television everyday at a high percent, 70% and 80% vs. 51% for white 6th graders
- 27.3% of Hispanic 6th graders do not participate in any sports vs. 18% of white 6th graders

Gender highlights

- Boys play video games at twice the rate of girls, 52% compared to 26.1%
- Half of the girls, 51.1% skip at least one meal whereas only 38.8% of boys skip meals in a given day
- One in five girls eats breakfast at school, twice that amount, 42% of boys eat breakfast at school
- The percentage of Girls and Boys who eat fast food is similar 27% for boys and 24% for girls (four or more times/week)